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Investigating effect of *Helicobacter pylori* treatment on improvement of non-alcoholic fatty liver parameters: a randomized trial

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Abstract

Background and objective: The correlation between the eradication of *Helicobacter pylori* (HP) and non-alcoholic fatty liver disease (NAFLD) is a controversial one. The aim of this study is to investigate the effect of *Helicobacter pylori* treatment on liver function tests and lipid profiles and to compare its effects with exercise therapy and diet alone.

Method: This was a double-blind randomized clinical trial conducted at Qazvin University of Medical Sciences. One hundred patients with NAFLD having a positive test for urea breath testing were randomly assigned into one of the intervention and comparison groups. The diet and physical activity program were given to two groups of patients for 8 weeks, three sessions per week. In addition to the above therapy, the patients in the intervention group also received HP treatment for 2weeks. The data corresponding to anthropometric and clinical features before and after the intervention were collected in both groups and compared using appropriate statistical methods.

Results: After the treatment interventions, the variables of weight, BMI, blood glucose, triglyceride, AST, ALT, total cholesterol, and LDL-C were significantly decreased in both groups ($p < .05$). In the between-group comparisons, only ALT was significantly lower in the intervention group (HP) ($p < .05$).

Conclusion: Findings of this study showed that the eradication of *Helicobacter pylori* could significantly improve the ALT index, but it had no additional effect on changes in metabolic indicators.

Trial registration: Registration number: IRCT2015042020951N2
Name of trial registry: The study of treatment of *Helicobacter pylori* in improvement of non-alcoholic fatty liver disease
The date of registration: 2015-05-12
Where the full trial protocol can be accessed: https://fa.irct.ir/trial/18489

Keywords: Non-alcoholic fatty liver disease, Helicobacter pylori, Alanine transaminase, Aspartate aminotransferases

Background

Non-alcoholic fatty liver disease (NAFLD) is a type of liver injury caused by metabolic stress and hereditary sensitivity. Generally, this disease is considered to be the liver manifestation of the metabolic syndrome [1, 2]. NAFLD includes non-alcoholic fatty liver (NAFL), non-alcoholic steatohepatitis (NASH), and non-alcoholic steatohepatitis associated with hepatic cirrhosis and hepatocellular carcinoma. The incidence of NAFLD complications is rapidly increasing in the world [2, 3]; therefore, the economic and clinical burden of this disease is significant. Recently, except for the known risk factors such as obesity, type 2 diabetes, hypertension, and dyslipidemia, the role of the pathogenesis of *Helicobacter pylori* (HP) is also discussed in the disease and may be associated with NAFLD [4, 5].

HP is a Gram-negative bacterium that is selectively placed in the gastric mucosa. This bacterium is the cause of most cases of gastric ulcers and leads to development of some

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body weight could result in the sustained biochemical improvement. Given the limitations expressed in the diagnosis of the disease, for future studies, it is recommended to use biopsy and magnetic resonance elastography (MRE) to diagnose and MRE to follow up.

Abbreviations

ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; HDL: High-density lipoprotein; HP: Helicobacter pylori; LDL: Low-density lipoprotein; NAFL: Non-alcoholic fatty liver; NAFLD: Non-alcoholic fatty liver disease; NASH: Non-alcoholic steatohepatitis

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Authors' contributions

All authors read and approved the final manuscript. AK did the design, data gathering, and manuscript preparation. AS did the data gathering, analysis, and manuscript preparation. EH did the data gathering and manuscript preparation. ZA did the data gathering and manuscript preparation. AH did the design, data gathering, analysis, and manuscript preparation.

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Availability of data and materials

Data and materials were available for study.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Qazvin University of Medical Sciences and the participation of individuals was subject to a written consent (Ethics committee reference number: 28/20/9669).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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References

1. Benedict M, Zhang X (2017) Non-alcoholic fatty liver disease: an expanded review. World J Hepatol 9(16):715
2. Neuschwander-Tetri BA (2017) Non-alcoholic fatty liver disease. BMC Med 15(1):45
3. Engin AB, Engin A (2017) Obesity and lipotoxicity: Springer
4. Cai O, Huang Z, Li M, Zhang C, Xi F, Tan S (2018) Association between Helicobacter pylori infection and nonalcoholic fatty liver disease: a single-center clinical study. Gastroenterol Res Pract 2018:8040262 Pubmed Central PMCID: PMC5828541. Epub 2018/03/13. eng
5. Kang S, Kim D (2016) PTH-112 association between Helicobacter pylori infection and nonalcoholic fatty liver disease in the United States. BMJ Publishing Group 65: A273–A274
6. Malfertheiner P, Megraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT et al (2017) Management of Helicobacter pylori infection-the Maastricht V/Florence consensus report. Gut 66(1):6–30 PubMed PMID: 27707777. Epub 2016/11/02. eng
7. Burucoa C, Axon A (2017) Epidemiology of Helicobacter pylori infection. Helicobacter 22(Suppl 1):e12403 PubMed PMID: 28891138. Epub 2017/09/12. eng
8. Eusebi LH, Zagari RM, Bazzoli F (2014) Epidemiology of Helicobacter pylori infection. Helicobacter 19(Suppl 1):1–5 PubMed PMID: 25167938. Epub 2014/08/30. eng
9. Leja M, Axon A, Brenner H (2016) Epidemiology of Helicobacter pylori infection. Helicobacter 21(Suppl 1):3–7 PubMed PMID: 27531531. Epub 2016/08/18. eng
10. Franceschi F, Gasbarrini A, Polyzos SA, Kountouras J (2015) Extragastric diseases and Helicobacter pylori. Helicobacter 20(Suppl 1):40–46 PubMed PMID: 26372824. Epub 2015/09/16. eng
11. Nasif WA, Mukhtar MH, Nour Eldein MM, Ashgar SS (2016) Oxidative DNA damage and oxidized low density lipoprotein in Type II diabetes mellitus among patients with Helicobacter pylori infection. Diabetol Metab Syndr 8: 34 PubMed PMID: 27148410. eng
12. Taylor NS, Fox JG, Yan L (1995) In-vitro hepatotoxic factor in Helicobacter hepaticus, H. pylori and other Helicobacter species. J Med Microbiol 42(1): 48–52 PubMed PMID: 7739025. Epub 1995/01/01. eng
13. Takuma Y (2011) Helicobacter pylori infection and liver diseases. Gan To Kagaku Ryoho 38(3):362–364 PubMed PMID: 21403438. Epub 2011/03/16. jpn
14. Jamali R, Mofid A, Vahedi H, Farzaneh R, Dowlatshahi S (2013) The effect of helicobacter pylori eradication on liver fat content in subjects with non-alcoholic Fatty liver disease: a randomized open-label clinical trial. Hepat Mon 13(12):e14679 PubMed PMID: 24358044. eng
15. Hashemi MR, Rahnavardi M, Bikdeli B, Dehghani ZM (2006) H pylori infection among 1000 southern Iranian dyspeptic patients. World J Gastroenterol 12(34):5479–5482 PubMed PMID: 17006984. Epub 09/14. eng
16. Lankarani KB, Ghaffarpasand F, Mahmoodi M, Lotfi M, Zamiri N, Heydari ST et al (2013) Non alcoholic fatty liver disease in southern Iran: a population based study. Hepat Mon 13(5):e9248 PubMed PMID: 23922564. eng
17. Ambade VN, Sharma YV, Somani BL (1998) Methods for estimation of blood glucose : a comparative evaluation. Med J Armed Forces India 54(2):131 PubMed PMID: 28775446. Pubmed Central PMCID: PMC5531325. Epub 1998/04/01. eng
18. Jia KK, Zhang J (2010) Evaluation of five routine glucose methods on an Olympus AU5400 analyzer using the CDC hexokinase reference method. Clin Chem Lab Med 48(3):361–364 PubMed PMID: 20170396. Epub 2010/02/23. eng
19. Knopfholz J, Disserol CC, Pierin AJ, Schirr FL, Streisky L, Takito LL et al (2014) Validation of the friedewald formula in patients with metabolic syndrome. Cholesterol 2014:261878 PubMed PMID: 24672715. Pubmed Central PMCID: PMC3941209. Epub 2014/03/29. eng
20. Jamali R, Khonsari M, Merat S, Khoshnia M, Jafari E, Bahram Kalhori A et al (2008) Persistent alanine aminotransferase elevation among the general Iranian population: prevalence and causes. World J Gastroenterol 14(18):2867–2871 PubMed PMID: 18473412. Pubmed Central PMCID: PMC2710729. Epub 2008/05/14. eng
21. Polyzos SA, Nikolopoulos P, Stogianni A, Romiopoulos I, Katsinelos P, Kountouras J (2014) Effect of Helicobacter pylori eradication on hepatic steatosis, NAFLD fibrosis score and HSENSI in patients with nonalcoholic steatohepatitis: a MR imaging-based pilot open-label study. Arq Gastroenterol 51(3):261–268 PubMed PMID: 25296089. Epub 2014/10/09. eng
22. Okushin K, Takahashi Y, Yamamichi N, Shimamoto T, Enooku K, Fujinaga H et al (2015) Helicobacter pylori infection is not associated with fatty liver disease including non-alcoholic fatty liver disease: a large-scale cross-sectional study in Japan. BMC Gastroenterol 15:25 PubMed PMID: 25880912. Pubmed Central PMCID: PMC4349671. Epub 2015/04/17. eng
23. Della Pepa G, Vetrani C, Lombardi G, Bozzetto L, Annuzzi G, Rivellese AA (2017) Isocaloric dietary changes and non-alcoholic fatty liver disease in high cardiometabolic risk individuals. Nutrients 9(10):1065
24. Slentz CA, Bateman LA, Willis LH, Shields AT, Tanner CJ, Piner LW et al (2011) Effects of aerobic vs. resistance training on visceral and liver fat stores, liver enzymes, and insulin resistance by HOMA in overweight adults from STRRIDE AT/RT. Am J Physiol Endocrinol Metab 301(5):E1033–E1039 PubMed PMID: 21846904. Pubmed Central PMCID: PMC3214001. Epub 2011/08/19. eng
25. Park SK, Park JH, Kwon YC, Kim HS, Yoon MS, Park HT (2003) The effect of combined aerobic and resistance exercise training on abdominal fat in obese middle-aged women. J Physiol Anthropol Appl Hum Sci 22(3):129–135 PubMed PMID: 12808225. Epub 2003/06/17. eng
26. Sigal RJ, Kenny GP, Boule NG, Wells GA, Prud'homme D, Fortier M et al (2007) Effects of aerobic training, resistance training, or both on glycemic control in type 2 diabetes: a randomized trial. Ann Intern Med 147(6):357–369 PubMed PMID: 17876019. Epub 2007/09/19. eng

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